angles of an equilateral triangle whose sides are about 5″, instead of one exposure of three times the length. It was asserted that a photograph obtained in this manner, in which each of the exposures was continued for twenty minutes, would exhibit more stars than a photograph with a single exposure of one hour. It was eventually decided that the chart plates taken at the even degrees should have a single exposure, while the exposures of the plates taken at the odd degrees should be left to the discretion of the observers.

The third and last point to which reference may be made here is the length of time to be generally devoted to securing a plate for the chart. It was generally felt that, if the exposures were made long enough to secure the impressions of a fourteenth magnitude star, as generally understood in photometric work, the length of time required would entail too great a strain upon the capacity of the observer. It has therefore been recommended by a sub-committee to confine the exposures to about forty minutes, which, it is believed, will be about eight or ten times the exposure required to impress the image of an eleventh magnitude star on plates as at present employed, and under the ordinary meteorological conditions of the Paris Observatory.

CRYSTALS OF PLATINUM AND PALLADIUM.

I HAVE found that crystals of the metals platinum and palladium are easily prepared as follows:—

A ribbon of the pure metal is stretched horizontally between two binding screws. Upon the ribbon, some topaz, reduced to a fine powder, is dusted. A current is now passed through the ribbon, of a strength sufficient to raise it to a bright red heat. In about half an hour's time, if the current be stopped and the ribbon examined with a microscope, it will be found that very small brilliant crystals cling here and there to projecting points on the partially decomposed topaz. If the heat be maintained, these crystals steadily grow; in about two hours some will have attained to a size of about 0·1 mm.

Platinum was the first substance which I crystallized in this manner. When the topaz was scraped off the ribbon, the under surface of the caked fragments was found covered with a grey deposit of the small crystals. Under the microscope, using a 1-inch objective, these present a very brilliant appearance. They are opaque, and show a high metallic lustre, like that of clean mercury, but are somewhat whiter in colour. The faces are clean, and sharply defined. Their crystallographic system is very evidently cubic. The prevailing form is the octahedron, or some modification of it. When the octahedron is perfect, the triangular faces are equilateral. Strings of octahedra occur, after the manner of magnetite. A common modification of the octahedron is that well known in the case of alum, in which two opposite faces of the solid are dominant, giving a tabular form. Very thin hexagonal tables also occur, suggesting, at first sight, dimorphism. These, in the opinion of Prof. Sollas, might be referred to an extreme development of the alum habit. Many observations support this view, which seems preferable to supposing dimorphism.

Hemihedral forms occur, principally the tetrahedron and modifications of it. The combination of tetrahedron and cube, the tetrahedron being dominant, is observed. Acicular forms are also present, but are scarce. The following observations bear upon the nature of these crystals.

Treated in hot hydrochloric, sulphuric, or nitric acid, they are unattacked. They also appear unaffected in cold hydrofluoric acid. In hot hydrofluoric acid they seem slightly attacked. They are slowly but completely dissolved in boiling aqua regia, from which a precipitate of ammonium platinic-chloride is obtained on the addition of ammonium chloride. They are not attracted by the electro-magnet, and conduct electricity (shown by touching the opposite extremities of a crystal with fine needles in circuit with a battery and galvanometer). When crushed between two glass slips they spread out, giving the glass the appearance of a mirror. Although in this way much extended, they show no appearance of cracking upon the edge. They are therefore very malleable. Their melting-point approximates to that of platinum, for a ribbon with some of these crystals clinging to it may be raised to its melting-point, when some of the crystals will be found partially fused. The ribbon upon which crystals have been formed presents a roughened appearance.

The bodies present at their formation are platinum, fluorine, silica, alumina, and a trace of iron. From the physical characters observed, however, the crystals are certainly metallic, and in fact can only be platinum, probably in a very pure state. It would appear that fluorine, liberated at a high temperature from the topaz, attacks the platinum, forming a fluoride, which again breaks up, depositing the crystals.

M. Moissan has already observed that the tetrafluoride of platinum when reduced leaves distinct crystals of the metal (NATURE, vol. xli. p. 118). M. Moissan obtained the fluoride by the direct action of dry fluorine on platinum at a low red heat, and mentions that this body splits up again at a higher temperature. The position of the greater part of the crystals in the present experiment, close to the surface of the platinum, is in agreement with the instability of the fluoride at a high temperature. It seems necessary to suppose the formation of the fluoride to occur further away from the ribbon where the temperature is suitable. So that it appears that a considerable volatilization of the platinum takes place. It is remarkable that, if the conditions are such that the temperature throughout the mass of the mineral is uniform, the crystals of platinum are not formed. Thus, if powdered topaz is rolled up tightly in a tube of platinum, and this tube heated for a considerable time by the passage of a strong current, the mineral is decomposed, there is considerable loss of weight, but no platinum crystals are formed. On the other hand, acicular crystals, which are colourless and transparent, are found under these conditions plentifully intermixed through the partially fused *débris*.

It appeared probable that some related metals might afford crystals in the same manner. Palladium and iridium suggested themselves. The latter I have not yet been successful with, owing to the difficulty of obtaining a piece of suitable dimensions. Palladium ribbon was easily obtained, Messrs. Johnson, Matthey, and Co. supplying this and the other pure metals.

The ribbon of palladium was treated in the same manner as the platinum. Crystals were easily formed.

These are very similar in colour and lustre to the crystals of platinum. In form they appear isomorphous; I have not been able to detect any difference, so that the foregoing remarks on the form of the platinum crystals apply to these also. It seems reasonable to suppose that a tetrafluoride of palladium is concerned in their formation.

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DR. NANSEN ON GLACIATION.

IT may be worth while to call attention to one or two points of scientific interest in connection with the results obtained by the heroic band of Norwegians, whom Dr. Nansen led across Greenland, as set forth by the chief of the expedition in the appendix to the "First Crossing of Greenland" (Longmans, 1890).

(1) The importance of the internal heat of the earth and its conductive transmission to the contact-plane, as a factor in the mechanics of glaciers, for which I contended eight years ago, may be said to be now established. The

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views of Tyndall and Helmholtz as to the important part played by liquefaction of the ice under pressure and regelation, with all that follows from this law, have also received important corroboration.

(2) All that Dr. Nansen has recorded of the snow-covered "inland-ice," goes to show how important a factor a loose covering of snow is in dispersing the solar rays, and so preventing the transmission of a large part of the *luminous* energy into the ice, where, on the "greenhouse principle" (see NATURE, vol. xxvii. p. 554) it would otherwise be converted into dark heat by absorption, and so facilitate the "flow" of the ice.

(3) The interpretation of the observed facts of the Waigatz Sound (about 71° N. lat.), quoted by Dr. Nansen from Prof. Helland, must be received with some caution. It is based largely on the assumption that the basalt capping of the district referred to was once a *continuous sheet*, whereas it is just as likely that the portions of the basalt cap now observed may be only originally separate tongues of the lava-flow, and that the soft Tertiary strata have been worn out by the action of frost and running water as an ordinary "fjord." Erosive action of glacier-ice seems here unnecessarily invoked. Even supposing these strata to be of an age so late as the Miocene, there is a wide berth in *time* for the action of running water, aided and supplemented by the disintegrating action of frost, which Dr. Nansen's own record shows, in the present condition of things, to be (in the interior) often some degrees below the freezing-point of mercury in such latitudes. Then, again, there is the important consideration, which Dr. Nansen touches upon but slightly, that the Miocene period of Greenland may not have synchronized with that period in more southern latitudes. The *relative* value of the different periods of the Tertiary age, as affected by latitude, is a matter, which, so far as I know, has not received from geologists anything like that consideration to which it is entitled, though the reason may not be far to seek.

(4) The extension of the lower parts of the ice-sheet into the valleys to form glaciers has, I think, been over-estimated as an agent of *erosion*, insufficient account having been taken of the expenditure of mechanical force in the shearing of the ice. This argument has been more fully worked out by myself in my paper on the "Mechanics of Glaciers" (*Q.J.G.S.*, vol. xxxix. pp. 64, 65).

(5) The summary manner in which the formation of "*åsar*" is dealt with (*op. cit.*, p. 494) seems to be based upon the assumption that they were formed beneath the ice-sheet; but this can scarcely be said to be established. Against the results arrived at by Dr. N. O. Holst, of Stockholm, from an extended investigation of these phenomena in Sweden, the non-observance of surface-rivers on the Greenland ice-sheet, rather late in the season of the year, by Nansen's party, can scarcely be said to militate very strongly, seeing that such rivers were observed by Nordenskiöld. The *åsar* are best known in formerly glaciated regions of more southern latitudes, successive zones of which would constitute the *marginal* areas of the ancient ice-sheet during its gradual diminution and the retreat of the ice from lower to higher altitudes; while a different configuration of the country would furnish the necessary moraine material, which would appear, from Dr. Nansen's observations, to be almost wanting in Greenland, though Dr. Holst saw a good deal in the summer of 1880 (see the *American Naturalist* for August 1888, p. 707).

A. IRVING.

NOTES.

LAST week men of science and the general public were sincerely sorry to receive bad reports as to the state of Prof. Tyndall's health. On Wednesday there was a severe crisis in his illness, but afterwards hopeful symptoms manifested themselves, and these, we are glad to say, have since been maintained.

THE vacancy in the position of Director of the Royal Meteorological Institute of the Netherlands, caused by the death of Prof. Buys-Ballot last year, has been filled up by the appointment of Dr. Maurice Snellen, who has for many years been connected with the Institute. Dr. Snellen represented Holland at the Meteorological Congress of Rome in 1879. He was the chief of the Dutch Expedition to Dickson Harbour in 1882, to take part in Weyprecht's scheme. It will be remembered that the Expedition was caught in the ice, and eventually had to abandon the ship and return without ever reaching its destination.

THE forthcoming International Ornithological Congress at Budapest is expected to be a great success. It will be held from May 17 to 20. There will be various interesting exhibitions, and the following lectures will be delivered:—On the life of West African birds, by Alexander Homeyer, of Greifswald; on the results of observations upon the passage of birds, by Otto Herman; on the life of birds in Arctic Norway, by Robert Collett, of Christiania; and on the life of Alpine birds, by Victor zu Tschudi Schmidthoffen. After the close of the proceedings expeditions will be made to various parts of Hungary.

THE Medical Faculty of Queen's College, Birmingham, with the contents of the museums and other property belonging to it, is to be transferred to Mason's College, where for some time a part of its work has been carried on. This has been formally decided by the Council of Queen's College, whose action has been ratified by the governors of the institution. The decision is an important one, and may prove to be the first step towards the establishment of a University for the Midlands. During the last few years there has been a great increase of medical students, and this has rendered the present accommodation much too small, whilst the Queen's College authorities have no funds available which would permit them to carry out the necessary reconstruction. Moreover, it is felt that the systematic part of medical education should be carried out under the control of one Board, and not as at present under the direction of two independent Councils. New buildings, adjoining those of the Mason College, and connected with them, but having also an independent entrance, will be erected for the School of Medicine, and in the plans due provision will be made for the largely-increased number of students whom it is expected the more perfect equipment and enlarged facilities of the new school will attract.

THE Council of the Society of Arts, acting under the provisions of the Benjamin Shaw Trust, have offered two gold medals, or two prizes of £20 each, to the executive committee of the Congress of Hygiene and Demography, for any inventions or discoveries of date subsequent to 1885, exhibited at or submitted to the Congress, and coming within the terms of the Trust. Under the conditions laid down by the donor, these prizes are to be offered for new methods of obviating or diminishing risks incidental to industrial occupations.

STEPS are being taken in Paris to prepare the way for the holding of an International Colonial Exhibition next year on the Champ de Mars. According to the Paris correspondent of the *Times*, the sections would be geographical, not political, all the West Indies, for instance, forming one section, all India another, and so on. Specimens of all the native populations would be brought over and housed as at their homes, and two Congresses—a Colonial and an Ethnographical—would be held.

AN International Agricultural Congress will be held at the Hague in September next, from the 7th to the 12th. A Commission will be appointed at the Hague to arrange for the reception of the members.

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